IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of:

Worrel

Serial No. 10/708,854 Group Art Unit: 3683

Filed: 03/29/2004 Examiner: Kramer, Devon C.

For: VEHICLE REGENERATIVE BRAKING SYSTEM WITH SYSTEM MONITOR AND REDUNDANT CONTROL CAPABILITY

Attorney Docket No. 81098042CIP

CERTIFICATE OF MAILING/TRANSMISSION (37 C.F.R. § 1.8(a))

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Donna Kraft
Signature

Date: 1-12-2007

Donna Kraft

RESPONSE TO NOTICE OF NON-COMPLIANT APPEAL BRIEF AND CORRECTED APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This corrected Appeal Brief is submitted in response to the Notice of Non-Complaint Appeal Brief dated December 20, 2006.

I. Real Party in Interest

The real party in interest in this matter is Ford Global Technologies, LLC, which is a wholly owned subsidiary of Ford Motor Company both in Dearborn, Michigan (hereinafter "Ford").

II. Related Appeals and Interferences

There are no other known appeals or interferences which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

III. Status of the Claims

Claims 1-11 are pending in the application. Claims 1-11 stand rejected in the Final Office Action. The rejection of each of Claims 1-11 is being appealed.

IV. Status of Amendments

There have been no Amendments filed after the final rejection.

V. Summary of Claimed Subject Matter

Independent Claims 1 and 10 are best understood with reference to paragraphs 31-35 of Appellants' specification, and with reference to Appellants' Figures 2 and 3.

Appellants' system provides regenerative and friction braking in a vehicle. The system includes a brake controller for determining a desired rate of deceleration from sensor outputs which are responsive to inputs from an operator of the vehicle. A regenerative braking system is connected with the brake controller and with one or more road wheels of the vehicle. The regenerative braking system is under command of the brake controller to produce a braking torque corresponding to the desired rate of deceleration. A primary speed sensing system is operatively connected with the brake controller and determines the speed and deceleration of the vehicle. A primary comparator which is operatively connected with the brake controller compares the desired rate of deceleration with the rate of deceleration determined by the primary speed sensing system. A brake monitor receives the sensor inputs from the operator of the vehicle and determines an audit range of deceleration of the vehicle. A redundant deceleration sensor which is operatively connected with the brake monitor determines the vehicle's deceleration. A secondary comparator, which is operatively connected with the brake monitor compares the audit range of deceleration with the output from the redundant

deceleration sensor. Finally, a friction braking system which is operatively connected with both the brake controller and the brake monitor, provides additional braking in the event that the comparison results from either the primary comparator or the secondary comparator indicate that the regenerative braking system is not producing the commanded rate of deceleration.

The individual elements of independent Claim 1 are best understood as follows. A brake controller for determining a desired rate of deceleration from sensor outputs which are responsive to inputs from an operator of the vehicle is disclosed at paragraph 31, lines 1-3, and lines 13-20 of Appellants' specification. A regenerative braking system operatively connected with said brake controller and with one or more roadwheels of said vehicle, with said regenerative braking system being commanded by said brake controller to produce a braking torque corresponding to the desired rate of deceleration is disclosed at paragraph 22, lines 4-19 and at paragraph 24, lines 10-15. A primary speed sensing system, operatively connected with said brake controller, for determining the speed and deceleration of said vehicle is disclosed at paragraph 28, lines 6-13. A primary comparator, operatively connected with said brake controller, for comparing the desired rate of deceleration with the rate of deceleration determined by said primary speed sensing system is disclosed at paragraph 31, at lines 1-20. A brake monitor for receiving said sensor inputs from the operator of the vehicle, and for determining an audit range of deceleration of the vehicle is disclosed at paragraph 32, lines 1-5, and at paragraph 34, lines 1-21. A redundant deceleration sensor, operatively connected with said brake monitor, for determining the vehicle's deceleration is disclosed at paragraph 31, lines 1-20. A secondary comparator, operatively connected with said brake monitor, for comparing the audit range of deceleration with the output from said redundant deceleration sensor is disclosed at paragraph 31, lines 1-20. Finally, a friction braking system, operatively connected with both said brake controller and with said brake monitor, for providing additional braking in the event that the comparison results from either the primary comparator or the secondary comparator indicate that said regenerative braking system is not producing the commanded rate of deceleration is disclosed at paragraph 24, lines 1-8.

With respect to independent Claim 10, determining a desired rate of deceleration from sensor outputs is disclosed at paragraph 31, lines 13-20; commanding a regenerative braking system to produce braking torque corresponding to the desired rate of deceleration is disclosed at paragraph 22, lines 4-9, and at paragraph 24, lines 10-15; measuring the speed and deceleration of said vehicle by means of a primary speed sensor is disclosed at paragraph

28, lines 6-13; comparing the desired rate of deceleration with the measured rate of deceleration, by means of a primary comparator is disclosed at paragraph 31, lines 1-20; determining an audit range of acceptable deceleration of the vehicle from said sensor outputs which are responsive to inputs from an operator of the vehicle is disclosed at paragraph 32, lines 1-5, and at paragraph 34, lines 1-21; measuring the vehicle's deceleration by means of a redundant deceleration sensor is disclosed at paragraph 31, lines 1-20; comparing the audit range of deceleration with the output from said redundant deceleration sensor, by means of a redundant comparator is disclosed at paragraph 31, lines 1-20; and providing additional braking by means of a friction braking system, in the event that the comparison results from either the primary comparator or the redundant comparator indicate that said regenerative braking system is not producing the commanded range of deceleration is disclosed at paragraph 24, lines 1-8.

VI. Grounds of Rejection to be Reviewed on Appeal

Are Claims 1, 3-8, and 10 properly rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al (5,839,800) in view of Gerstenmaier (JP 6-144153)?

Is Claim 2 properly rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al (5,839,800) in view of Gerstenmaier, supra, and Byrne et al (4,094,555)?

Are Claims 9 and 11 properly rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al (5,839,800) in view of Gerstenmaier, supra, and Crombez et al (6,655,754)?

VII. Argument

The Rejection of Claims 1, 3-8 and 10 under 35 U.S.C. §103(a) over Koga in view of Gerstenmaier is not sustainable.

Regarding Claims 1 and 10, the Examiner states that Koga et al teaches a brake controller for determining a desired rate of deceleration from sensor outputs, and also teaches a regenerative braking system commanded by the brake controller to produce a braking torque corresponding to the desired rate of deceleration. The Examiner further states that Koga et al has a primary speed sensing system for determining speed and deceleration of a vehicle, as well as a deceleration sensor and a brake monitor for receiving sensor inputs for determining an audit range of deceleration. The Examiner admits that Koga et al lacks the specific teaching of comparing two values from separate sensors to a target deceleration; for this, the Examiner

looks to Gerstenmaier, which is cited for a teaching of redundancy in sensors in vehicle brake systems. Finally, the Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to have provided Koga et al with redundancy in the sensing of deceleration as taught by Gerstenmaier, to improve vehicle safety and insure operation of the brakes.

As noted above, the Examiner admits that Koga does not teach or suggest comparing two values with a target deceleration, using separate systems. However, Gerstenmaier does not teach this, either. Appellant respectfully submits that neither Koga, nor Gerstenmaier, whether taken singly, or in combination with each other, either teach or suggest a system having a redundancy set forth in Appellant's Claims 1 and 10. The fact is that although Koga does not teach redundancy of sensing, and although redundancy of sensing is apparently taught by Gerstenmaier, neither Koga nor Gerstenmaier teaches using the results of separate sensors with separate comparators, in what is, in essence, a partitioned system, to determine whether braking is proceeding as desired by the driver of a vehicle.

Appellant's Claims 1 and 10 recite comparing of a desired rate of deceleration with a measured rate of deceleration by means of a primary comparator, and comparing an audit rate of deceleration with the output from a redundant deceleration sensor by means of a redundant comparator. This dual redundancy is neither taught nor suggested by either Koga or Gerstenmaier. The Examiner's contention that Gerstenmaier teaches redundancy is correct insofar only to the extent that Gerstenmaier teaches redundancy of sensing. The Examiner's attention is hereby is directed to first five lines of the abstract (translation) provided by the Examiner for Gerstenmaier, wherein it is stated "the controller redundantly processes sensor signals in two parallel channels and monitors through a common perfect (sic) monitor". Thus, Gerstenmaier teaches the use of a single monitor, which is precisely the deficiency sought to be avoided by Appellant's claimed invention. As a result, each of Claims 1-10, as well as those Claims depending therefrom, are allowable over the Examiner's rejection and the rejection should be reversed.

The rejection of Claim 2 under 35 U.S.C. 103(a) over Koga et al (5,839,800) in view of Gerstenmaier and Byrne et al (4,094,555) is not sustainable

Claim 2 depends from Claim 1 which is allowable over Gerstenmaier and Koga as previously as set forth. Because Byrne teaches only comparing the output of a decelerometer with an upper and lower deceleration target value in the context of a vehicle stability control,

Byrne whether taken singly, or in combination with either Koga and/or Gerstenmaier does not teach Appellant's claimed invention as set forth in Claim 1, and Claim 2 and should therefore be passed to issue notwithstanding the Examiner's rejection.

The rejection of Claims 9 and 11 under 35 U.S.C. 103(a) over Koga et al (5,839,800) in view of Gerstenmaier and Crombez et al (6,655,754) is not sustainable.

Claims 9 and 11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Koga in view of Gerstenmaier and further in view of Crombez et al (6655754). The Examiner states that Crombez teaches use of a warning indicator for a driver. Crombez does not, however, teach or suggest the dual monitoring claimed by Appellant.

Appellant respectfully submits that neither Koga et al, nor Gerstenmaier, nor Crombez, which is assigned to the assignee of the present invention, whether taken singly, or in any combination or sub-combination, either teach or suggest the system set forth in Claims 1 and 10. Crombez adds nothing which could overcome the previously noted deficiencies of any rejection based upon Koga and Gerstenmaier. As a result the Examiner's rejection of Claims 9 and 11, which depend respectively from Claims 1 and 10, should be reversed.

VIII. Claims Appendix

A copy of each of the claims involved in this appeal, namely Claims 1-11, is attached as a Claims Appendix.

IX. Evidence Appendix

None.

X. Related Proceedings

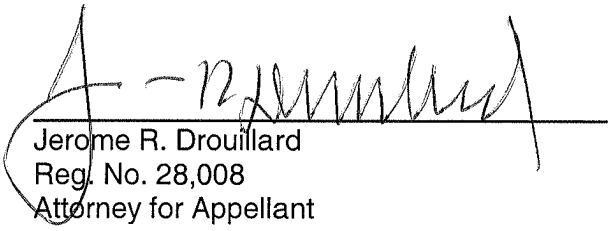
None.

XI. Conclusion

For the foregoing reasons, Appellant respectfully requests that the Board direct the Examiner in charge of this examination to withdraw the rejections.

Please charge any fees required in the filing of this appeal to deposit account 06-1510.

Respectfully submitted,



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CLAIMS APPENDIX

Claim 1. A system for providing regenerative and friction braking in a vehicle, comprising:

a brake controller for determining a desired rate of deceleration from sensor outputs which are responsive to inputs from an operator of the vehicle;

a regenerative braking system operatively connected with said brake controller and with one or more roadwheels of said vehicle, with said regenerative braking system being commanded by said brake controller to produce a braking torque corresponding to the desired rate of deceleration;

a primary speed sensing system, operatively connected with said brake controller, for determining the speed and deceleration of said vehicle;

a primary comparator, operatively connected with said brake controller, for comparing the desired rate of deceleration with the rate of deceleration determined by said primary speed sensing system;

a brake monitor for receiving said sensor inputs from the operator of the vehicle, and for determining an audit range of deceleration of the vehicle;

a redundant deceleration sensor, operatively connected with said brake monitor, for determining the vehicle's deceleration;

a secondary comparator, operatively connected with said brake monitor, for comparing the audit range of deceleration with the output from said redundant deceleration sensor; and

a friction braking system, operatively connected with both said brake controller and with said brake monitor, for providing additional braking in the event that the comparison results from either the primary comparator or the secondary comparator indicate that said regenerative braking system is not producing the commanded rate of deceleration.

Claim 2. A system according to Claim 1, wherein said brake monitor determines an audit range deceleration of the vehicle comprising lower and upper deceleration targets, with said secondary comparator comparing the output from the redundant deceleration sensor with both of said deceleration targets.

Claim 3. A system according to Claim 1, wherein said primary speed sensing system comprises at least one wheel speed sensor.

Claim 4. A system according to Claim 1, wherein said redundant deceleration sensor comprises a g-force sensor.

Claim 5. A system according to Claim 1, wherein said primary speed sensing system comprises a g-force sensor.

Claim 6. A system according to Claim 1, wherein said redundant deceleration sensor comprises at least one wheel speed sensor.

Claim 7. A system according to Claim 1, wherein said sensor inputs which are responsive to an operator of the vehicle are outputs from a brake pedal pressure sensor, a brake pedal position sensor, and an accelerator pedal position sensor.

Claim 8. A system according to Claim 1, wherein said sensor outputs which are responsive to an operator of the vehicle are outputs from a brake pedal pressure sensor, a brake pedal position sensor, and an accelerator pedal position sensor.

Claim 9. A system according to Claim 1, further comprising an indicator for advising an operator of the vehicle that an operational anomaly is present in the regenerative braking system.

Claim 10. A method for operating a vehicle regenerative braking system with a system monitor and redundant control capability, comprising the steps of:

determining a desired rate of deceleration from sensor outputs which are responsive to inputs from an operator of the vehicle;

commanding a regenerative braking system to produce braking torque corresponding to the desired rate of deceleration;

measuring the speed and deceleration of said vehicle by means of a primary speed sensor;

comparing the desired rate of deceleration with the measured rate of deceleration, by means of primary comparator;

determining an audit range of acceptable deceleration of the vehicle from said sensor outputs which are responsive to inputs from an operator of the vehicle;

measuring the vehicle's deceleration by means of a redundant deceleration sensor;

comparing the audit range of deceleration with the output from said redundant deceleration sensor, by means of a redundant comparator; and

providing additional braking by means of a friction braking system, in the event that the comparison results from either the primary comparator or the redundant comparator indicate that said regenerative braking system is not producing the commanded range of deceleration.

Claim 11. A method according to Claim 10, further comprising the step of activating an indicator to alert an operator of the vehicle in the event that the rate of deceleration produced by the regenerative braking system, as measured by the redundant deceleration sensor, does not lie within said audit range rate of deceleration.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None.